

XIII.—The Recent Voles of the *Microtus nivalis* Group.

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ALTHOUGH probably once more generally distributed, the voles of the *Microtus nivalis* group are at the present day rather strictly confined to the mountains of the Mediterranean—Black Sea region. They are known to occur in the Pyrenees, Alps, Apennines, Carpathians, and Caucasus\*, as well as at considerable altitudes in Asia Minor and Palestine; while at only a single locality in Southern France has a living species been found in the plains. The supposed occurrence of a member of the group in Kashmir† is the result of a misdetermination of generic characters‡; and there seems to be no sufficient reason to regard *Microtus strelzowi*, Kashstchenko§, from Central Altai, as anything but a somewhat aberrant *Alticola*. The seven forms represented in the collection of the British Museum show that the group is sufficiently extensive and well-defined to be recognized as a distinct subgenus:—

CHIONOMYS, subgen. nov.

1858. *Paludicola*, Blasius, Säugethiere Deutschlands, p. 334 (part.).  
Not of Wagler, 1830.  
1847. *Praticola*, Fatio, Les Campagnols du Bassin du Léman, p. 34  
(part.). Not of Swainson, 1837.  
1896. *Microtus*, Miller, North Amer. Fauna, no. 12, p. 62 (part.)  
(July 23, 1896).

*Type species*.—*Arvicola nivalis*, Martins.

*Characters*.—Like the subgenus *Microtus*, but third upper molar with only two re-entrant angles on each side, as in *Arvicola* and some forms of *Pitymys*; skull with broad, rather flat, smooth brain-case and wide interorbital region, the temporal ridges low and inconspicuous; posterior termination of palate essentially as in *Microtus*, but with the elements usually less well defined.

\* Satunin, Zool. Jahrb. ix. p. 302 (1896). Dagestan.

† *Microtus imitator*, Bonhote, Ann. & Mag. Nat. Hist. 7th ser. xv. p. 197 (February 1905).

‡ The structure of the palate shows that the animal is an *Alticola*. The teeth are peculiar in their somewhat generalized form, as compared with those of the previously known members of the genus.

§ Results of the Altai zoological expedition of 1898, p. 50 (Russian text), pl. ii. figs. 2 & 3 (1899); Annuaire du Mus. Zool. de l'Acad. Imp. des Sci. de St. Pétersbourg, iv. p. 37 (Russian text), figs. 2*b* & 3*b*. See especially figure of molar teeth in original description, and side view of skull in later account (where the species is made type of the new subgenus *Platycranus*).

*Key to the Members of the Subgenus Chionomys.*

- Pterygoids with inner faces not parallel; width of mesopterygoid fossa anteriorly much greater than distance from edge of fossa to alveolus of  $m^3$ .
- Ear about 16.5 mm.; molars with salient angles unusually acute. (Northern Asia Minor; Caucasus?) ..... *Microtus pontius.*
- Ear about 13.6 mm.; molars with salient angles not unusually acute. (Palestine.) ..... *M. hermonis.*
- Pterygoids with inner faces parallel (vertical); width of mesopterygoid fossa anteriorly never more than equal to distance from edge of fossa to alveolus of  $m^3$ . (Europe.)
- Hind foot in adult less than 20 mm.; back clear light grey or with very slight brownish tinge; tail always white ..... *M. lebrunii.*
- Audital bullæ large and strongly inflated (normal); back with slight brownish tinge. (Basses-Alpes.) ..... *M. l. leucurus.*
- Audital bullæ small and flattened; back clear light grey. (Gard.) ..... *M. l. lebrunii.*
- Hind foot in adults 20 mm. or more; back decidedly brownish; tail often not entirely white.
- Posterior border of palate with median ridge sharply defined, its width less than that of deep lateral pit; back strongly clouded with blackish; tail usually dark above ..... *M. ulpius.*
- Posterior border of palate with median ridge seldom sharply defined, its width always at least equal to that of shallow lateral pit; back slightly or not clouded with blackish; tail usually not dark above ..... *M. nivalis.*
- Anterior loop of first lower molar with postero-external salient angle usually narrow and sharply pointed, never obsolete. (Alps.) ..... *M. n. nivalis.*
- Anterior loop of first lower molar with postero-external salient angle usually broad and rounded, sometimes obsolete. (Pyrenees.) ..... *M. n. aquitanus.*

*Microtus nivalis* (Martins).

(Synonymy under subspecies.)

*Geographical distribution.*—Pyrenees, Alps (except extreme south-western portion), Apennines, and Tyrol.

*Characters.*—Size large (hind foot 20 to 22 mm., condylo-basal length of skull in adults 28 to 30.4 mm.). Skull with pterygoids vertical, their inner surfaces parallel; mesopterygoid fossa narrow, its width anteriorly never more than equal to distance between fossa and alveolus of third

molar; posterior border of palate with median ridge usually flattened and ill-defined, its width at least equal to that of shallow lateral pit. Colour smoke-grey above, strongly washed with bistre on back, and usually tinged with pale buff along sides; underparts dull white, irregularly clouded by the slaty under-colour; feet and tail whitish, the tail usually (in about two-thirds of the skins examined) tinged with brown above, but apparently never sharply bicolor.

*Microtus nivalis nivalis* (Martins).

1842. *Arvicola nivalis*, Martins, Revue Zoologique, p. 331. (Faulhorn, Switzerland.)  
 1843. *Arvicola alpinus*, Wagner, Schreb. Säugth., Suppl. iii. p. 576. (Andermatt, Switzerland.)  
 1845. *Arvicola nivicola*, Schinz, Synops. Mamm. ii. p. 236. (Highest Swiss Alps; probably near Andermatt.)  
 1853. *Hypudæus petrophilus*, Wagner, Münch. Gelehrt. Anzeiger, p. 307 (March 28, 1853). (Obersdorf, near Sonthofen, Allgäu, Bavaria.)

*Type locality*.—Faulhorn, Switzerland.

*Geographical distribution*.—Alps, Apennines, and Tyrol. (Probably includes more than one geographical race.)

*Characters*.—Anterior loop of first lower molar tending to assume an arrow-head-like outline, owing partly to the general narrowness of the loop, but more especially to the form of the postero-external salient angle, which is usually narrow and sharply pointed, and rarely if ever \* obsolete.

*Remarks*.—The form of the anterior loop of the first lower molar appears to be characteristic of the Alpine race of *Microtus nivalis*, as the specimens that I have examined are immediately recognizable by this character alone. In two skulls from the type locality of *Hypudæus petrophilus*, kindly placed at my disposal by Dr. C. I. Forsyth Major, and in the single specimen in the British Museum from the Apennines † (Mt. Cimone, collected by Dr. Major), this loop is of the broadly crescentic form characteristic of the Pyrenean race. The Mt. Cimone specimen also appears to have the rostrum unusually robust. The material is, however, insufficient for satisfactorily determining the exact status of *petrophilus* and the Apennine animal.

*Microtus nivalis aquitanicus*, subsp. n.

*Type*.—Young adult male (skin and skull) collected near

\* Never in the material thus far examined.

† See also the figures of Apennine specimens published by Hintou, Proc. Geol. Assoc. xx. pt. 2, pl. i. figs. 1-4 (1907).

l'Hospitalet, Ariège, France, altitude 4800 feet, August 27, 1906, by G. S. Miller. Original number 7082.

*Geographical distribution.*—Pyrenees; at present known from the eastern half of French side only (Pyrénées Orientales, Ariège, and Hautes Pyrénées).

*Characters.*—Similar to *Microtus nivalis nivalis*, but anterior loop of first lower molar broadly crescentic in outline, the posterior external salient angle broad and rounded, occasionally obsolete.

*Measurements.*—Type: head and body 111 mm.; tail 59; hind foot 21; ear from meatus 16. Skull: condylo-basal length 28; zygomatic breadth 17.4; interorbital constriction 4.27; occipital breadth 14; occipital depth (median) 7.8; nasal 8.6; diastema 9.2; mandible 18.6; maxillary tooth-row 7.0; mandibular tooth-row 7.0.

*Remarks.*—Among the fourteen skulls examined there is not a specimen which shows any near approach to the characters of the typical Alpine race. As already pointed out, the form of the anterior loop of the first lower molar in the Pyrenean animal is essentially duplicated in specimens from Tyrol and the Apennines.

*Microtus ulpius*, sp. n.

*Type.*—Adult female (skin and skull). B.M. no. 3.2.2.48. Collected at altitude of 2000 feet near Hatszeg, Hunyad, Eastern Hungary, November 20, 1902, by C. G. Danford. Original number 13.

*Geographical distribution.*—Known only from the vicinity of the type locality, but probably occurring throughout the Transylvanian Alps, and perhaps in the true Carpathians also.

*Characters.*—Similar to *Microtus nivalis*, but colour darker and tail usually brown above (often distinctly bicolor throughout); posterior border of palate with median ridge sharply defined, its width less than that of deep lateral pit; anterior loop of first lower molar as in *M. nivalis aquitanus*.

*Measurements.*—Type: head and body 131 mm.; tail 58; hind foot 20; ear 17. Skull: condylo-basal length 30.4; zygomatic breadth 18; interorbital constriction 4.4; occipital breadth 15; occipital depth (median) 7.4; nasal 8.0; diastema 9.2; mandible 19.4; maxillary tooth-row 7.2; mandibular tooth-row 7.0.

*Remarks.*—This species is well differentiated from *Microtus nivalis* by the peculiar form of the palate and by the dark colour of the upperparts. Among the thirteen skins examined all show traces of brown on the upper surface of the

tail, while in seven (including the type) the tail is distinctly bicolor throughout.

*Microtus lebrunii* (Crespon).

(Synonymy under subspecies.)

*Geographical distribution*.—South-eastern France (Departments of Gard and Basses-Alpes).

*Characters*.—Like *Microtus nivalis*, but smaller (hind foot less than 20 mm.; condylo-basal length of skull in adults less than 28 mm.) and paler, the tail always pure white throughout; the back a light grey without conspicuous brownish suffusion.

*Remarks*.—This species, although described more than sixty years ago, has remained of very doubtful status until within a few months. Mr. Charles Mottaz, of Geneva, Switzerland, has recently visited the Departments of Gard and Basses-Alpes in the interests of the British Museum, and, thanks to his successful work, it is now possible to form some definite opinion as to the animal's relationships.

*Microtus lebrunii lebrunii* (Crespon).

1844. *A[rvicola] lebrunii*, Crespon, Faune Méridionale, i. p. 77.

1857. *Arvicola nivalis*, b. *Arvicola leucurus*, Blasius, Säugethiere Deutschlands, p. 359 (part.).

*Type locality*.—Neighbourhood of Nimes, Gard, France. Altitude about 550 feet.

*Geographical distribution*.—Known only from the type locality.

*Characters*.—Back a clear, very pale smoke-grey, without evident wash of wood-brown. Skull with audital bullæ small and flattened, noticeably different in both form and relative size from those of *Microtus nivalis*; other cranial characters as in *M. nivalis*, except for the smaller general size of the skull; teeth rather smaller than those of *M. nivalis*, the anterior loop of the first lower molar resembling that of *M. nivalis aquitanius*.

*Measurements*.—Adult male, no. 5519 (*Mottaz*): head and body 122 mm.; tail 66; hind foot 18·8; ear 14. Skull: condylo-basal length 27·4 (ca.); zygomatic breadth 15 (ca.); interorbital constriction 4·6; occipital depth (median) 7·4; nasal 8; diastema 8·2; mandible 18; maxillary tooth-row 6·4; mandibular tooth-row 6·2.

*Remarks*.—The typical form of *Microtus lebrunii* is easily recognizable by its small size, pale colour, and flattened

audital bullæ. It is, however, remarkably similar to *Microtus nivalis*, when one considers the peculiarities of its habitat in the midst of the vine and olive region of the Mediterranean coast.

*Microtus lebrunii leucurus* (Gerbe).

1852. *Arvicola leucurus*, Gerbe, Revue Zoologique, 2nd ser. iv. p. 260 (June 1852).

1857. *Arvicola nivalis*, b. *Arvicola leucurus*, Blasius, Säugethiere Deutschlands, p. 359 (part.).

*Type locality*.—Barcelonnette, Basses-Alpes, France. Altitude about 4000 feet.

*Geographical distribution*.—South-western Alps.

*Characters*.—Back a pale smoke-grey, slightly but evidently washed with wood-brown. Skull with audital bullæ large and well-inflated, essentially as in *Microtus nivalis*, with which the other cranial characters agree.

*Measurements*.—Adult female topotype, no. 5623 (*Mottaz*): head and body 120 mm.; tail 68; hind foot 19; ear 1.48. Skull: zygomatic breadth 16 (ca.); interorbital constriction 4.6; nasal 8.0; diastema 8.8; mandible 18; maxillary tooth-row 7.0; mandibular tooth-row 6.8.

*Remarks*.—The two topotypes secured by Mr. Mottaz show that this animal resembles *M. lebrunii lebrunii* in its small size and pale colour, but that the skull remains essentially as in *M. nivalis*. The specimens were taken among rocks near water in a locality which seemed perfectly adapted to the needs of *Microtus nivalis*.

*Microtus pontius*, sp. n.

*Type*.—Adult male. B.M. no. 5. 10. 4. 53. Collected at altitude of 7000 feet, about 25 miles north of Baibort, Turkey in Asia, July 21, 1905, by R. B. Woosnam. Original number 62. Presented by Col. A. C. Bailward.

*Geographical distribution*.—The species is known from the type locality only.

*Characters*.—Size about as in *Microtus lebrunii*. Skull with pterygoids inclined outward, their inner surfaces not parallel; mesopterygoid fossa broad, its width anteriorly much greater than distance between fossa and alveolus of third molar; posterior border of palate and form of audital bullæ as in *M. nivalis*; general outline of skull rather more slender than in the other members of the group; teeth peculiar in the small size and very marked alternation of the triangles in the upper molars and the unusual slenderness

and acuteness of all salient angles, though the actual number of elements is in no way abnormal; anterior loop of first lower molar in the single known specimen essentially as in *M. nivalis aquitanicus*; general colour above a pale buffy grey, the middle of back rather strongly tinged with dull buff; tail and feet dull white. Underparts white, irregularly clouded by the slaty under-colour.

*Measurements.*—Head and body 112 mm.; tail 67; hind foot 19; ear 16.5. Skull: condylo-basal length 28.6; zygomatic breadth 16; interorbital constriction 4.2; occipital breadth 12.6; occipital depth 7.0; nasal 8.0; diastema 8.6; mandible 18; maxillary tooth-row 6.6; mandibular tooth-row 6.4.

*Remarks.*—This species, though represented by the type specimen only, is strikingly characterized by the peculiarities of the mesopterygoid fossa resulting from the unusual tilting outward of the pterygoids. The light buffy colour is also different from that in any other known form.

*Microtus hermonis*, sp. n.

1884. *Arvicola nivalis*, Tristram, Survey of Western Palestine, Fauna and Flora, p. 13.

*Type.*—Adult male (in alcohol). B.M. no. 64. 8. 17. 31. Collected on Mount Hermon, Palestine, by the Rev. H. B. Tristram.

*Geographical distribution.*—Known from the type locality only.

*Characters.*—Differs from *Microtus pontius*, its nearest geographical ally, in the decidedly shorter ear (13.6 mm. instead of 16.5 mm.) and the less acute, less strongly alternating triangles of the upper molars. Distinguishable from the European members of the group by the narrower, more elongated outline of the third upper molar. Structure of palate not known.

*Measurements.*—Tail 56 mm.; hind foot 19; ear 13.6; upper tooth-row 6.2.

*Remarks.*—Nothing remains of the skull of the type and only known specimen except the right upper tooth-row. It is therefore impossible to decide whether the pterygoids resemble those of *Microtus pontius* or of the European members of the subgenus. On geographical grounds the former seems the more probable, though the latter alternative is not impossible in view of the general character of the teeth.